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A new record of *Schistura reticulata* from Myanmar with a note on fish diversity of Yu River

Bungdon Shangningam* and Laishram Kosygin

Zoological Survey of India, Freshwater Fish Section, 27 J.L Nehru Road, Kolkata - 700016, West Bengal, India; Email: bdshangningam@gmail.com, lkzsi5@yahoo.com

Abstract

Ichthyofaunal diversity of the Yu River in the Sagaing region of Myanmar is reported in this paper. A total of 49 species of fishes belonging to 38 genera and 19 families are recorded from the river. The region's fish fauna includes two endangered, two vulnerable, one near threatened, twenty-nine least concern and three under data deficient categories of IUCN. An endangered species, *Schistura reticulata* Vishwanath & Nebeshwar (2004), is reported for the first time from Myanmar.

Keywords: Diversity, Freshwater Fish, Myanmar, Range Extension

Introduction

Fishes are of immense value to human communities since the dawn of civilization. They constitute over one-half of the world's living vertebrates. Interestingly, about two-thirds of all species in the largest families are freshwater fishes, whereas only about 43% of all fishes are predominantly freshwater species (Nelson *et al.*, 2016). Myanmar is endowed with rich fish diversity due to its extensive Chindwin-Ayeyarwady River drainage running north to south with a vast water bodies network. Myanmar harbours 1076 fish species, of which 516 are distributed in freshwaters and 588 in seawaters (Froese & Pauly, 2019). The Chindwin-Ayeyarwady is the engine of the Myanmar economy. It feeds the country's population with fish and rice and enables goods to be transported to people up and down the river (WWF Freshwater, 2018). Some new genera and species of fish have been described from the Chindwin-Ayeyarwady River basin in recent times (Roberts, 2020; Conway *et al.*, 2021).

The Yu River, an important tributary of the Chindwin-Ayeyarwady, lies in the Indo-Burma region one of the world's biodiversity hotspots. The river's biodiversity is characterized by high species richness, the occurrence of threatened, endemic and charismatic freshwater fish species of great interest. Interestingly, the river is home to the freshwater hill-stream fishes of taxonomic interest and many undescribed species. Currently, there is no complete and precise list of the fish found in the Yu River.

This study reports a collection of fishes in the Yu River near Tamu, Sagaing region in Myanmar, included 37 specimens of *Schistura reticulata*, reported herein for the first time from Myanmar.

Materials and Methods

The fishes of the Yu River of Sagaing region, Myanmar (Figure 1) were surveyed from 20 to 21 December 2018. Specimens were collected generally from fisherman who used different nets, traps and local fishing techniques. Methods of collecting the fishes differ depending upon their habit and size. Specimens were preserved in ethanol. General measurements and counts follow Hubbs and Lagler (1946) and Kottelat (2001). The methods of Kullander and Fang (2004), Kullander (2008), Conway and Kottelat (2010) and Kottelat (1990) were followed, for *Garra, Pethia, Psilorhynchus* and *Schistura* respectively. Counts and measurements of catfishes followed Ng and Lim (1995) with some modifications. Identification of species of the remaining genera followed Jayaram (1999) and Talwar and Jhingran (1991). The specimens were also identified by comparing with type and other specimens in the Zoological Survey of India, Kolkata. The families have been arranged phylogenetically following classification

* *Author for correspondence*

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Figure 1. Map showing the collection site of Yu River, Sagaing region, Myanmar.

of fishes Nelson (2006) and species under alphabetic sequence. The correct zoological name with author citation and status (IUCN, 2020) are shown against each other. A systematic checklist of fishes with their status is also provided based on the present collection from the Yu River, Sagaing region, Myanmar.

Results

Schistura reticulata (Vishwanath & Nebeshwar, 2004) (Figure 2)

(Neomacheilus vinciguerrae (non Hora, 1935): Menon, 1987: **134** (Chindwin basin, Manipur, India).

Schistura reticulate Vishwanath & Nebeshwar, 2004:**15**(4) 323-330, (type locality-Maklang, Lokchao and Wanze streams of Manipur, India, Chindwin Basin)

Material examined: 37 exs, 35.0-64 mm SL, Myanmar, Sagaing region, Tamu District, Yu River near Tamu, 24˚13'N 94˚19'E, 21-22-xii-2018, coll. Shangningam (ZSI FF8051).

Figure 2. *Schistura reticulata,* ZSI FF 8051, 64.0 mm SL, Myanmar, Sagaing region, Yu River.

Description: Body slightly depressed and compressed anteriorly, more compressed posteriorly. Body entirely covered with embedded scales except on belly in front of pelvic fins. In predorsal area, scales widely scattered. On caudal peduncle, scales patially overlapping. Lateral lines complete with 84-102 scales. Axillary pelvic lobe present. No marked adipose crest on caudal peduncle. Largest recorded size 64 mm SL

Dorsal fin with 3 simple and 8½ branched rays its distal margin straight. Pectoral fin with 1 simple and 10-11

Table 1. Systematic checklist, common name, IUCN status and remarks of the fish fauna of Yu River, Myanmar

	Common Name	IUCN status	Remarks
Phylum CHORDATA Subphylum VERTEBRATE (CRANIATA) Super class GNATHOSTOMATA Class ACTINOPTERYGII Division TELEOSTEI Subdivision OSTEOGLOSSOMORPHA Order OSTEOGLOSSIFORMES			
Family NOTOPTERIDAE (Bleeker, 1859)			
1. *Notopterus notopterus* (Pallas, 1769)	Bronze featherback	LC	Native
Subdivision OSTARIOCLUPEOMORPHA			
Superorder OSTARIOPHYSI			
Order CYPRINIFORMES			
Family CYPRINIDAE (Rafinesque, 1815)			
Subfamily CYPRININAE			
2. *Neolissochilus stracheyi* (Day, 1871)	Mahseer	LC	Native
Subfamily BARBINAE			
3. *Hypsibarbus myitkyinae* (Prasad & Mukerji, 1929)		LC	Native
4. *Pethia stoliczkana* (Day, 1870)		NA	Native
5. *Puntius chola* (Hamilton, 1822)	Swamp barb	LC	Native
6. *Puntius sophore* (Hamilton, 1822)	Pool barb	LC	Native
Subfamily LABEONINAE			
7. *Bangana devdevi* (Hora, 1936)		LC	Native
8. *Garra gravelyi* (Annandale, 1919)		NT	Endemic
9. *Garra* sp. 1		NA	Native
10. *Garra* sp. 2		NA	Native
11. *Garra* sp. 3		NA	Native
12. *Tariqilabeo burmanicus* (Hora, 1936)		LC	Native
13. *Labeo dyocheilus* (M'Clelland, 1839)		LC	Native
Subfamily RASBORINAE (Danioninae)			
14. *Amblypharyngodon mola* (Hamilton, 1822)	Molacarplet	LC	Native
15. *Cabdio morar* (Hamilton, 1822)	Morari	LC	Native
16. *Devario deruptotaleae* (Ramananda & Vishwanath, 2014)		LC	Native
17. *Esomus danrica* (Hamilton, 1822)	Flying barb	LC	Native
18. *Opsarius barnoides* (Vinciguerra, 1890)		LC	Native
19. *Opsarius dogarsinghi* (Hora, 1921)		VU	Native
20. *Rasbora* sp		NA	Native
Family PSILORHYNCHIDAE (Hora, 1925)			

	Common Name	IUCN status	Remarks
21. *Psilorhynchus magnaoculus* (Shangn-ingam & Kosygin, 2021)		NA	Native
Family COBITIDAE (Fitzinger, 1832)			
22. *Acantopsis spectabilis* (Blyth, 1860)			
23. *Lepidocephalichthys guntea* (Hamilton, 1822)	Guntea loach	LC	Native
24. *Pangio pangia* (Hamilton, 1822)	Loach	LC	Native
Family BALITORIDAE (Swainson, 1839)			
25. *Balitora burmanica* (Hora, 1932)	Burmese stone loach	LC	Endemic
26. *Homalopteroids rupicola* (Prashad & Mukerji 1929)		LC	Endemic
Family NEMACHEILIDAE (Regan, 1911)			
27. *Schistura reticulata* (Vishwanath & Nebeshwar, 2004)	Loach	EN	Native
28. *Schistura kangjupkhulensis* (Hora, 1921)	Stone loach	EN	Native
29. *Schistura* sp.			
Order SILURIFORMES			
Family SISORIDAE (Bleeker, 1858)			
30. *Glyptothorax yuensis* Shangningam & Kosygin, 2022	Catfish		
31. *Glyptothorax* sp 2.	Catfish		
Family SILURIDAE (Cuvier, 1816)			
32. *Ompok bimaculatus* (Bloch, 1794)	Butter catfish	NT	Native
33. *Pterocryptis* sp.			
Family CLARIIDAE (Bonaparte, 1846)			
34. *Heteropneustes fossilis* (Bloch, 1974)	Stinging catfish	LC	Native
Family BAGRIDAE (Bleeker, 1858)			
Subfamily Bagrinae			
35. *Batasio affinis* (Blyth, 1860)	Catfish	DD	Native
36. *Batasio* sp.			
37. *Mystus pulcher* (Chaudhuri, 1911)		LC	Native
Subdivision EUTELEOSTEI			
Superorder ACANTHOPTERYGII			
Series ATHERINOMORPHA			
Order CYPRINODONTIFORMES			
Family BELONIDAE (Collette, 2003)			
38. *Xenentodon cancila* (Hamilton, 1822)	Freshwater garfish	LC	Native
Family APLOCHEILIDAE (M'Clelland, 1838)			
39. *Aplocheilus panchax* (Hamilton, 1822)	Blue panchax	LC	Native
Series PERCOMORPHA			
Order SYNBRANCHIFORMES			

	Common Name	IUCN status	Remarks
Family SYNBRANCHIDAE (Swainson, 1838)			
40. *Monopterus javanensis* (La Cepède, 1800)	Swamp eel	LC	Introduced
Family MASTACEMBELIDAE (Swainson, 1839)			
41. *Macrognathus morehensis* (Arunkumar & Tombi, 2000)	Eel	LC	Native
42. *Mastacembelus armatus* (La Cepède, 1800)	Zig zag eel	LC	Native
Order PERCIFORMES			
Family BADIDAE (Barlow, Liem & Wickler, 1968)			
43. *Badis ferrarisi* (Kullander & Britz, 2002)		LC	Native
44. *Badis* sp.			
Family GOBIIDAE (Cuvier, 1816)			
45. *Glossogobius giurus* (Hamilton, 1822)	Tank goby	LC	Native
Family ANABANTIDAE (Bonaparte, 1831)			
46. *Anabas testudineus* (Bloch, 1792)	Climbing perch	DD	Native
Family OSPHRONEMIDAE (van der Hoeven, 1830)			
47. *Trichogaster labiosa* (Day, 1877)		LC	Native
48. *T. faciatus* (Blotch, 1801)		LC	Native
Family CHANNIDAE (Fowler, 1934)			
49. *Channa gachua* (Hamilton, 1822)	Snakehead	LC	Native

branched rays, tip of fin situated between its base and pelvic-fin origin. Pelvic fin with 1 simple and 8 branched ray situated opposite vertical to the 3rd branched rays of dorsal fin. Anal fin with 3 simple and 5½ branched rays its longest ray not reaching caudal-fin base. Caudal fin forked with 8+7 branched rays.

Mouth semicircular, lips moderately thick, upper lip with a very small median incision, with some slightly marked median furrows. Lower lip with a deep median incision, median lobes with 5-6 well marked furrows and rest of lip plain. Processus dentiformis present, but not prominent. No median notch in upper jaw, inner rostral barbel not reaching corner of mouth, outer one just reaching corner of mouth.

Sexual dimorphism: Male with large suborbital flap. In females, ventral surface between pectoral fin rays having closely set minute tubercles.

Coloration: Body yellowish brown with 17-29 dark brown bars, bars in front ofdorsal fin thin, thicker behind dorsal fin. Interspace of bars ½ bars width anteriorly, gradually becoming as wide as bars on caudal peduncle. Some bars in front of dorsal-fin origin split vertically into two (or more) as they extend from back to sides, sometimes very close or fused with adjacent bars. Bars behind dorsal fin not divided. Dorsal surface of head and snout densely spotted or uniformly dark brown. Dorsal fin with a black spot at base of simple and first branched rays. Branched dorsal rays with 1-3 rows of dark spots,caudal fin with 2-3 irregular v-shaped rows of spots, pelvic and anal fins with black marks in middle.

Distribution: India: Manipur, Maklang, Lokchao and Wanze streams (Chindwin- Ayeyarwady drainage); Myanmar: Yu River, Sagaing region.

IUCN status: Endangered.

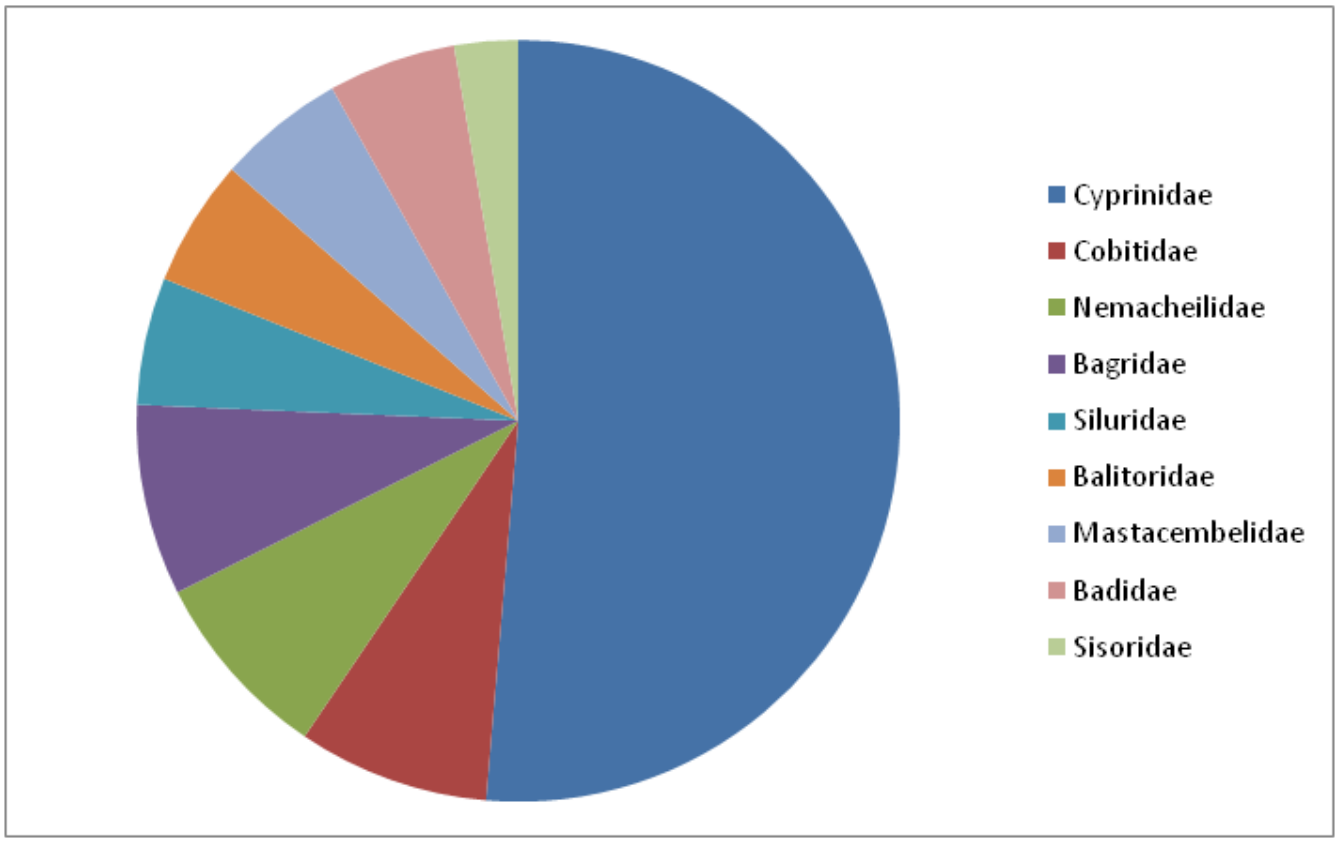

Figure 3. Fish fauna diversity of different family in Yu River, Sagaing region, Myanmar.

Discussion

A checklist of the fish fauna of the Yu River in Myanmar is provided in Table 1. The present study includes 49 species of fishes belonging to 38 genera, 19 families and 6 orders. *Schistura reticulata* is reported new to Myanmar. In 2004, *Schistura reticulata* was originally described by Vishwanath & Nebeshwar (2004) from Chindwin basin of Manipur, India. The species is endangered according to the IUCN red list assessment. Our collection of 37 specimens of *S. reticulata* in the Yu River in Sagaing region fully agrees with the original descriptions. Thus, the range of distribution of this species extended up to Yu River, Ayeyarwady drainage in Sagaing region, Myanmar.

The present study on the fishes of Yu River in the Sagaing region of Myanmar reveals high species diversity. It shows that the river has varied ecological conditions. The river supports endemic hill stream fishes having both ornamental and food values. Cyprinidae is the numerically most abundant primary freshwater fish family with 19 species under 13 genera followed by Nemacheilidae, Cobitidae and Bagridae with three species and Balitoridae, Mastacembelidae, Siluridae, Sisoridae and Badidae with two species each (Figure 3).

Of the 49 species reported, three are considered threatened based on IUCN (2020) conservation status. It includes two endangered species viz., *Schistura reticulata and S. kanjupkhulensis* and one vulnerable, *Opsarius dogarsinghi*. The study also includes one near threatened *Garra gravelyi,* twenty-nine least concern and three data deficient categories of IUCN. The fishes are facing threats due to habitat loss due to sand and gravel mining for construction and urban development in their habitats. Other important fishes with high fishery potential are facing threats due to overexploitation, water pollution, habitat destruction and flow modification. Immediate intervention is required for the conservation and to protect the habitat of these fishes.

The taxonomy of the fish fauna of Myanmar is still unsettled. Vishwanath *et al.* (2010) remarked that there is incomplete knowledge of the freshwater fish fauna of Myanmar. New species are still being discovered, and

many of those collected are yet to be formally described scientifically. The taxonomy of several groups is still not clear. More studies are needed to understand the freshwater resources of Myanmar.

Conclusion

The present study on the fishes of Yu River in the Sagaing region of Myanmar reveals high species diversity. Out of the 49 species reported, three are considered threatened. One endangered species, *Schistura reticulata* is reported for the first time from Myanmar. The Chindwin-Ayeyarwady River basin is considered an important natural shelter for many fish fauna which is less studied. The study of freshwater fishes in Chindwin-Ayeyarwady drainage is essential for the conservation of fish resources in Myanmar.

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